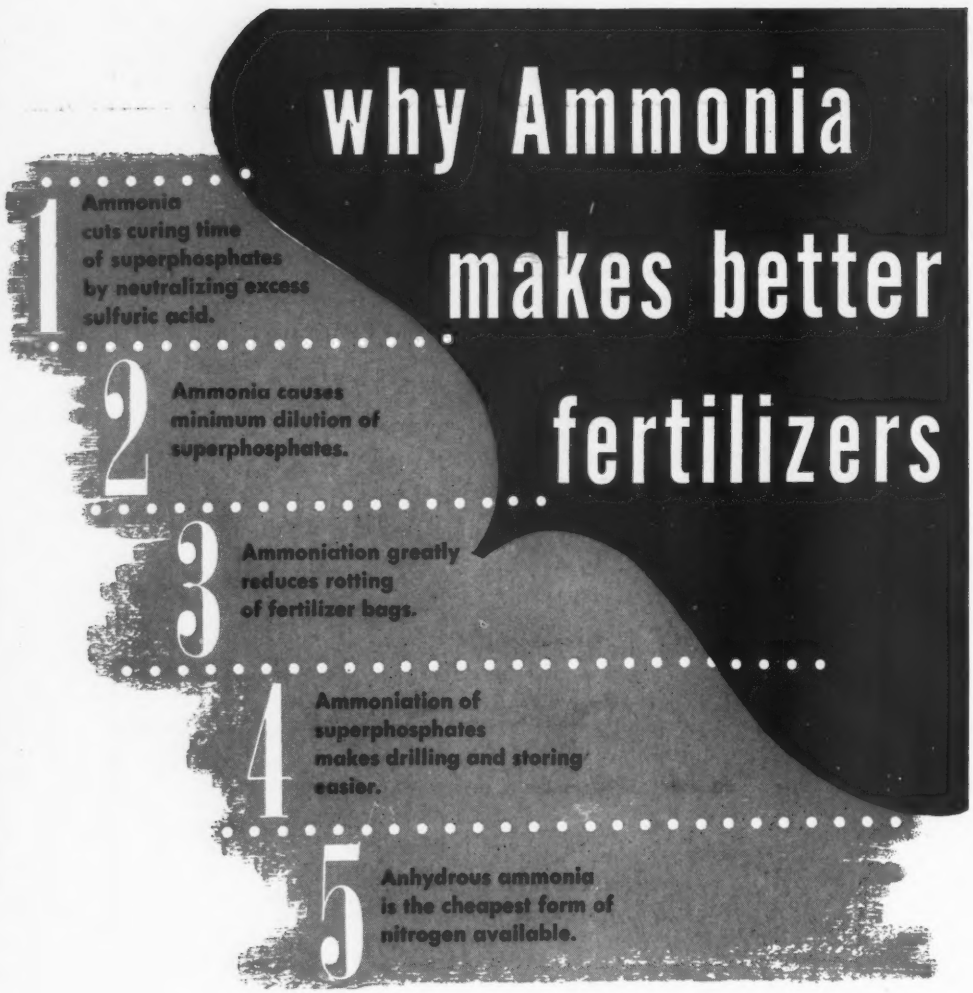
Vol. 106 No. 12 June 14, 1947

The American FERTILIZER



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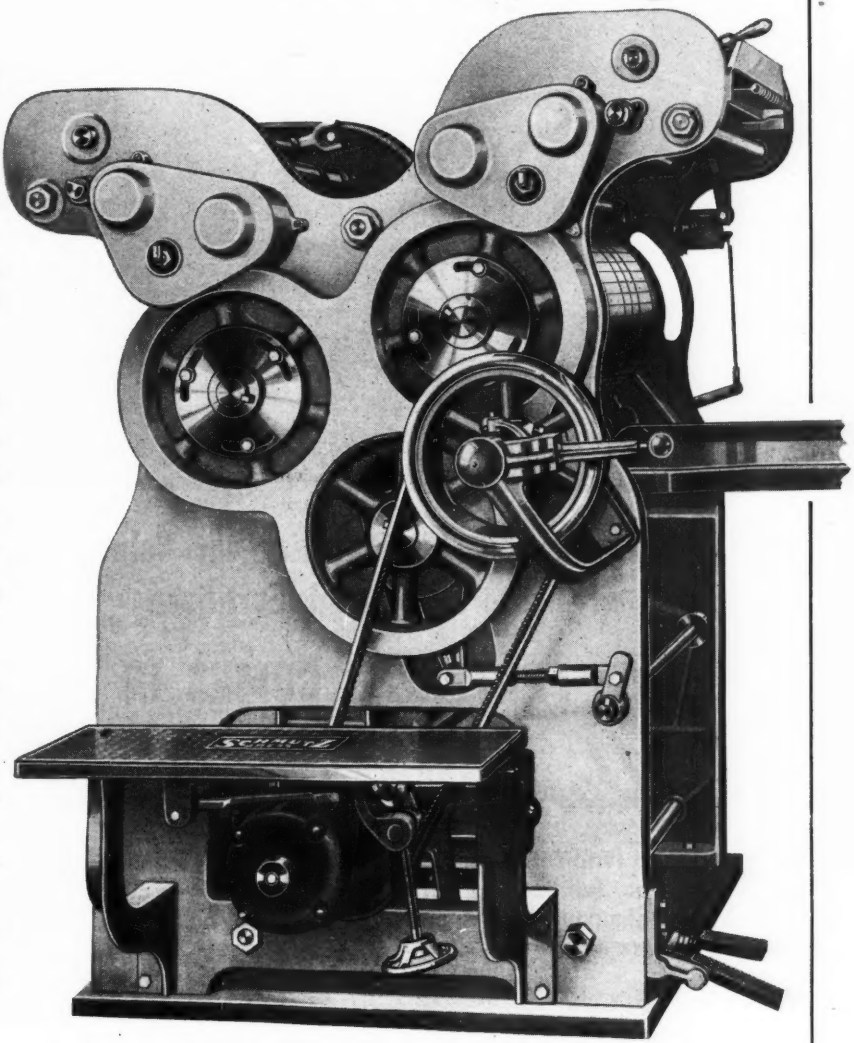

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The American FERTILIZER

Vol. 106 JUNE 14, 1947 No. 12

Senate Hearings On Fertilizer Bill

Arguments Heard for and Against Hickenlooper-Flannagan Measure to Put Government into Fertilizer Production. Industry's Position ell Presented by Leading Fertilizer Executives

THE hearings on the Soil Fertility Bill (S. 1251) which were held by the Senate Committee on Agriculture from May 26th to June 4th were successful in that they brought out an accurate picture of the current fertilizer situation as contrasted with the "wishful thinking" of the proponents of the bill. The highlight of the testimony was the statement of Secretary of Agriculture Anderson who opposed strongly the plan to put the Government into the fertilizer manufacturing business, although favoring the objectives of the measure to increase the use of fertilizer and liming materials.

The hearings were opened with testimony by Senators Hickenlooper and Hill, two of the sponsors of the bill, who were interrogated keenly by the members of the committee, notably by Ellender of Louisiana and Lucas of Illinois. The principal objections centered on the erection of the proposed phosphate plant at Mobile and the vast experimental program to be carried on by two per cent of the farms of the country. Even some of the bill's sponsors were not wholly satisfied with all provisions of the measure, Senator Bushfield of South Dakota criticizing the location of the proposed plant in Mobile rather than the Middle West, and Senator Thye of Minnesota questioning the need for such an extended experimental program in view of the large amount of work in this field being done by the U. S. and State Department of Agriculture.

On the second day of the hearing, the American Farm Bureau Federation, who were instrumental in having the bill introduced, presented their arguments. Farm Bureau President Edward A. O'Neal stated that, if American farmers were to use as much phosphate as some agricultural authorities recommend, it would take 80 plants the size of the Mobile plant to supply the additional needs. Other Farm Bureau officers reiterated this theme and stressed the need for larger supplies of concentrated phosphates.

Secretary Anderson States Opposition

On May 29th, Secretary of Agriculture Clinton P. Anderson was the sole witness. His testimony answered many of the points made by the bill's proponents and developed the following points:

1. Private industry is expanding its production facilities, but progress has been slow because of the shortage of construction materials and equipment. Until he is shown that private industry cannot meet the demands of farmers, he will oppose Government ownership and operation of plants.

2. He is not satisfied that the proposed location of the Government plant or the proposed processes would result in the most economical production and distribution of fertilizer. If any such plant were built he would be inclined to believe that it should be located in the West.

3. A program of Government building and maintenance of the Mobile plant would be subject to curtailment by the next or succeeding Congresses—a development that would not occur if private industry took over the job.

4. Under general supervision of the Farm Credit Administration banks for cooperatives have continuing authority to lend money to farmer cooperatives at reasonable rates of interest for the construction and operation of plants—hence the loan provisions in S. 1251 are unnecessary.

5. The industry has not neglected its opportunities to take over five Government nitrogen plants. For justifiable reasons it has not shown interest in some plants which could not be operated on an economical basis. U. S. D. A. has been discussing arrangements with the War Department by which the units of these plants could be reassembled and thereby made attractive to industrial investment.

6. The Secretary favors establishment of a national fertilizer policy and program involving the testing and demonstrating of liming materials, fertilizers and other conservation materials and has prepared a report incorporating a proposed substitute bill for S. 1251 and carrying out his principles.

Fertilizer Industry Testifies

On June 2nd and 3rd the members of the fertilizer industry were given the opportunity to be heard, and twelve representative executives gave an able presentation of the present picture and future prospects in the fertilizer field.

Charles E. Heinrichs, in charge of the Mining Department of the Virginia-Carolina Chemical Corporation, Richmond, Va., said "there is no need for the proposed Government mining program" provided under the measure because "private industry is well able and willing to expand its operations" to meet present and future phosphate rock needs "without seeking Government funds produced through taxation."

"In truth," he said, "that very expansion (of mining operations) is well under way and as usual the industry, even though quietly, has been and is doing a good job in spite of the difficulties and delays involved in obtaining equipment and supplies."

He charged that under provisions of the Hickenlooper-Flannagan bill "the phosphate rock miners, who have an enviable record of achievement through technical resourcefulness and high efficiency achieved under the competitive enterprise system are faced under the terms of S. 1251 by the prospect of the un-American procedure of extinction by confiscation." He pointed out that under Title III of the bill TVA is directed to acquire by lease, transfer or "otherwise" phosphate lands in Florida, either privately owned or in the public domain, as an "adequate reserve" for the Mobile, Alabama, proposed Government plant authorized under the bill. He said "public domain" phosphate lands "are virtually non-existent in Florida."

Heinricks testified that the Nation's phosphate reserves "are adequate for more than 1,000 years even on the basis of present incomplete knowledge."

Ralph B. Douglass, vice-president of the Smith-Douglass Co., Norfolk, Va., and chairman of the Executive Committee of the American Plant Food Council, testified that he "thoroughly realizes the importance of and strongly supports fundamental (agricultural) research and education, but not commercial production of fertilizers by Government agencies camouflaged as research" under the proposed legislation.

"Research is of the utmost importance to the fertilizer industry as well as to the farmer," he said, adding that "in addition to the vast program carried on by the U. S. D. A. . . . and in conjunction with the State Experiment Stations," the fertilizer industry "is doing extensive research work."

"It does not seem logical to drastically reduce the admittedly worth-while projects within U. S. D. A. . . . which are now in effect and at the same time pass other legislation which will require millions of dollars . . . and will not be as effective in accomplishing the desired objectives as presently organized agencies."

"I do not believe it (S. 1251) offers as sound a cure as projects already in existence, nor do I believe it will provide supplies of fertilizer . . . as quickly as private industry will catch up with demand if this legislation is not passed," he emphasized.

He said that notwithstanding wartime and post-war difficulties in obtaining essential materials for plant expansions, ". . . there has been and is now under way a tremendous expansion of production facilities."

O. C. Metzger, president of the newly-completed Ia-Conda Phosphate and Chemical Co., plant at Perry, Iowa, stated that "private industry in the Midwest is building to take care of the fertilizer demands" and that "new plants in Iowa and adjoining Mid-

(Continued from page 20)

Factors Influencing Desirable Levels of Plant Food In Fertilizers*

By J. Fielding Reed[1] and L. T. Alexander[2]

THE trend toward the use of higher analysis fertilizers has been pronounced in the last few years. This has been emphasized by others in this group. In the present discussion we will consider the subject from the standpoint of (1) the formulation of fertilizers as neutral or acid-forming, (2) the inclusion of ample quantities of secondary and minor elements in mixed fertilizers, and (3) the relation of concentration to problems of fertilizer application and distributing machinery.

Other studies point to the economy of buying the fertilizer with the highest guarantee in line with the nitrogen, phosphoric acid and potash needed for the crop. They may not take into consideration whether or not we should make the fertilizer a concentrated source of just these constituents at the expense of leaving out room for other necessary plant food elements; or whether we should provide for leaving a neutral or basic residue in the soil.

Formulation of Fertilizers Neutral or Acid-Forming

Let us first consider the desirability of making fertilizers non-acid forming or neutral. Such fertilizers usually are formulated with dolomitic limestone, which supplies calcium and magnesium and maintains a higher pH level in the root zone than the fertilizer which does not contain this material. Numerous experiments in the Southeastern states on acid soils have shown the increased yields that result from the use of non-acid forming fertilizers. Typical of these are the data in Table 1 which show that neutral fertilizers resulted in a better yield of potatoes, cotton, and strawberries. Although the results presented in Table 1 are attributable to the use of dolomitic limestone to neutralize the acidic effects of the fertilizers, it is not known whether the beneficial effects were in controlling acidity in the fertilized zone of the soil or in furnishing a source of calcium and magnesium that was needed by the crops.

TABLE 1

Comparison of Yields from Acid-Forming and Neutral Fertilizers

Crop	Soil Type	Yield per Acre		Increased yields per acre due to neutral fertilizer
		Acid	Neutral	
Irish potatoes	Bladen f. s. l.	238 bu.	255 bu.	17 bu.
	Portsmouth s. l.	198 bu.	212 bu.	14 bu.
Sweet potatoes	Norfolk l. f. s. light phase	160 bu.	174 bu.	14 bu.
	heavy phase	150 bu.	163 bu.	13 bu.
Cotton	Norfolk s.l.	899 lbs.	1192 lbs.	293 lbs. seed cotton
Strawberries	Norfolk s.l.	1371 qts.	1730 qts.	359 qts.

[1] Collins and Skinner, "Jour. Am. Soc. Agron." 34:894, 1942.

It would appear then that the desirability of supplying these limestone constituents to acid soils is hardly questionable. The point that *is* often questioned is the furnishing of these constituents through fertilizers, rather than as independent applications of dolomitic limestone. Although the quantity of dolomitic limestone applied to the soil as neutralizers in mixed fertilizers is not large in comparison with the amount added to the soil in a liming program, it may be relatively more effective because of the fact that it is applied in a small portion of the soil. It is possible that responses would be obtained in many cases to neutralizers in fertilizers even though the soil had been limed with dolomitic limestone to the desired pH level. A number of factors should be considered here. In the first place the use of limestone as a filler in place of sand hardly merits argument. Many of

* A paper presented at the Fertilizer Conference held at Beltsville, Md., January 8 and 9, 1947.

[1] Professor of Agronomy, North Carolina Agricultural Experiment Station, Raleigh, North Carolina.

[2] Principal Soil Scientist, Division of Soils, Fertilizers and Irrigation, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Maryland.

the grades being sold at present still have room for filler which should be limestone rather than sand in the Southeastern states. Hence the present necessity for some provision concerning the formulation of fertilizers non-acid forming.

But as we move toward high grades we face the issue of either holding down the level of N, P and K, or eliminating the requirement for non-acid formulation. There would seem to be little doubt as to which of the two is preferable from a theoretical viewpoint. The higher analysis fertilizer should be used, with the lime needs met by separate applications. On the practical side, however, the issue is not this simple. The southern farmer has been slow to adopt a sound liming program. While the lime use, under the impetus of the AAA program, has increased appreciably, it is still entirely inadequate. For example, the farmers of North Carolina this past year applied an average of a little over 40 pounds of ground limestone per acre. With this low lime usage, the non-acid forming fertilizer may be worth as much to him as one containing more N, P, or K. Perhaps the solution might lie in a policy which would include offering for sale both the high analysis mixtures, acid forming, and the somewhat lower grades, non-acid forming. The less expensive, per unit of plant food, high analysis fertilizer could be purchased by the farmer that is following a good system of farming including adequate use of dolomitic liming materials, while the lower grade, non-acid forming fertilizer could be furnished for those farmers applying all of their plant nutrients in the mixed fertilizer. A concurrent educational program could be directed at encouraging sound use of lime together with the more economical higher grades. In those areas of the United States where adequate liming practices are followed, the use of the less expensive sources of plant nutrients should be encouraged.

Inclusion of Secondary Elements in Mixed Fertilizers

A second major factor that must be considered is provision of ample quantities of the secondary and minor elements in mixed fertilizers. When considering the elements that should be provided for in fertilizers, it is well to bear in mind the composition of the crops that are being grown. Table 2 gives the composition of the above-ground portion of several important crops. The quantities of calcium, magnesium and sulphur utilized by the crops are considerable. In those regions having soils relatively low in these elements, consideration must be given to supplying them either in the fertilizer or as separate applications. Crop residues may play an important part in the nutrition of the plant since they may contain a major portion of the nutrients taken up by the plant.

The amounts of calcium, magnesium, and sulphur supplied to the soil by some high and low analysis fertilizers are given in Table 3. Note that, if the analysis goes to very high values, relatively small amounts of the secondary elements can be included. It was noted in the preceding discussion that the calcium and magnesium may be economically added in the liming materials. In addition, however, we should consider the desirability of making room in the fertilizer for such elements as sulphur and the trace elements, boron, copper, manganese, and zinc. Sulphur deficient areas and growth responses to application of sulphur have been reported for 12 states and 3 provinces in Canada. We cannot overlook this factor in formulating fertilizers. Admittedly the evidence is incomplete, and there are undoubtedly many areas where sulphur will not be necessary. On the other hand, until we have sufficient evidence to the contrary, we would be presumptuous in formulating fertilizers from materials that do not

(Continued on page 24)

TABLE 2

NUTRIENTS IN VARIOUS CROPS BASED ON ENTIRE ABOVE GROUND PORTION OF PLANTS

Crop	Pounds per Acre	Nutrients absorbed per acre, lbs.					
		N	P_2O_5	K_2O	CaO	MgO	SO_3
Potatoes[1]	7,142	142.9	25.7	231.9	55.6	29.8	26.5
Cotton[2]	9,720	134.3	60.9	119.8	162.0	61.1	....
Corn[3]	6,300	80	40	45	16	21	25
Red Clover[3]	3,000	60	15	58	64	18	12.5
Alfalfa[3]	4,000	95	25	107	103	17	25
Lespedeza[3]	3,000	65	14	37	46	11	....

[1] Hawkins, "Jour. Am. Soc. Agron." Vol. 38: 667–681, 1946—Includes below ground portion of plants.
[2] Olsen and Bledsoe, "Ga. Exp. Sta., Bull. 222." 1942.
[3] Assumed yields. Percentages of elements taken from Beeson. U. S. D. A. Misc. Pub. 269. 1941.

The Function of the States in Collecting and Analyzing Fertilizer Statistics*

By J. F. FUDGE[1]

(*Continued from the May 31, 1947 issue*)

Other Types of Analysis

Fertilizer statistics collected in the normal discharge of control duties may also be analyzed in a number of other ways which are of value to individuals or groups within the State. For example, Texas has for many years published information comparing the costs of different grades and materials. Last year the average selling price of ammonium nitrate was $54.87, as compared with an average valuation found of $84.98 while corresponding figures for cottonseed meal were $65.00 and $19.49. The average farmer can take these two sets of figures and see that ammonium nitrate is a much cheaper source of nitrogen than cottonseed meal. In another table, we have given the approximate average cost in cents per pound of nitrogen, available phosphoric acid, and potash. Last year, the average figures were 13.00, 7.00 and 7.00 cents per pound in 8–8–8, 15.08, 8.12, and 8.12 in a 4–12–4, and 63.82, 34.36, and 34.36 in sheep manure. Mr. Mehring recently wrote me that in his opinion "this has been a real service to the farmers of Texas and I think it has enabled them to save far more money in buying plant food than it costs to run your entire fertilizer control office." Other similar analyses might be made to answer questions of local importance.

The Collection of Statistics

Knowing what statistics are required for the analyses desired, the next questions deal with who should collect them and how they may best be collected.

The State control official who is charged by law with the control of the sale of fertilizers within the boundaries of his State is unquestionably the individual who should be responsible for the collection of statistics adequate in kind and amount to give the desired analyses. The official who, by default, makes it necessary for the agronomists or other agricultural specialists to collect and analyze fertilizer statistics, is not performing his duties in the way in which they should be performed. If the statistics he collects are adequate for proper control, they will also be adequate for proper analysis. Voluntary submission of statistics by fertilizer manufacturers or voluntary analyses by the control official are not sufficiently strong to get the job done. In order to get this work done properly, definite responsibility should be placed by law upon the guarantors of fertilizer to provide the control official with the necessary information, and upon the control official to collect, analyze and publish the statistics properly.

The statistics provision (Section 13) of the second draft of the Model Fertilizer Bill adequately takes care of tonnage statistics concerning different grades and materials but it does not take care of the tonnages sold in different counties within the State. It is, therefore, adequate from a national point of view, but does not go far enough from a State point of view.

Statistics adequate from the point of view of the individual States may be collected in a number of different ways. One way is by a current report of all sales, giving the amount and kind of each fertilizer and the name and address of the person to whom the fertilizer was sold. This may be done most easily by furnishing the control official with a copy of invoices of individual sales. This entails no extra work for the manufacturer and gives the control official complete information. It can also be done on forms furnished by the control official. Both ways may be used at will by the manufacturer, but the invoice system is used in Texas for nearly all sales since it is easier. In such a case, it is necessary to observe care that both methods are not used for the same sales, since this would result in duplication. This method also has the marked advantage that the control official is kept

(Continued on page 28)

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* A paper presented at the Fertilizer Conference held at Beltsville, Md., January 8 and 9, 1947.

[1] State Chemist of Texas and Chief, Division of Chemistry, Texas Agricultural Experiment Station, College Station, Texas.

THE AMERICAN FERTILIZER
ESTABLISHED 1894
PUBLISHED EVERY OTHER SATURDAY BY
WARE BROS. COMPANY
1900 CHESTNUT ST., PHILADELPHIA 3, PA.

A Magazine international in scope and circulation devoted exclusively to the Commercial Fertilizer Industry and its Allied Industries

PIONEER JOURNAL OF THE FERTILIZER INDUSTRY

A. A WARE, Editor
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K. F WARE Advertising Manager

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2246 E. Lake Road, N. E.,
Atlanta, Ga.

ANNUAL SUBSCRIPTION RATES

U. S. and its possessions, also Cuba and Panama	$3.00
Canada and Mexico	4.00
Other Foreign Countries	5.00
Single Copy	.25
Back Numbers	.50

THE AMERICAN FERTILIZER is not necessarily in accord with opinions expressed in contributed articles that appear in its columns.

Vol. 106 JUNE 14, 1947 No. 12

Principal Articles in This Issue

Florida Scientists Show N.F.A. Committee a Varied Research Program

The spring meeting of the Plant Food Research Committee of The National Fertilizer Association was held in Florida April 21–25. It is said that a picture is worth a thousand words but it would require a book to describe the many lines of research activities visited by the committee in following the itinerary arranged by Frank L. Holland, Director of The Florida Agricultural Research Institute.

Florida scientists are supplying farmers of their State with the answers to many agricultural problems. Florida, like other parts of the country, needs N, P, and K; but in addition many of its varied soils require the so-called secondary and minor elements. In such cases, magnesium, manganese, copper, and zinc are considered just as essential as N, P, and K. Without the application of these elements, when they are needed, fertilizer containing the usual three nutrient elements will not give the most satisfactory results.

Fig. 1. Snap beans grown on muck soil at the Everglades Station near Belle Glade. Sunflowers are used as wind breaks

The climate varies from temperate to subtropical and the extreme variation in soil types is greater than in most agricultural States. The soils range from fine sand, low in organic matter, to muck soils in the Everglades; from acid soils such as are commonly found in humid climates to the marl soil in the Homestead area; and from heavy soils in the north to stony soils in the extreme south near Florida City. Each of these soil types is supporting a prosperous agriculture.

To meet the needs of Florida agriculture seven branch experiment stations have been strategically located throughout the State. With a well-coordinated research program, widely differing problems do not dismay

Florida's scientists and the problems are approached with enthusiasm and determination by the staff under the direction of Harold Mowry.

At the Gainesville station, the committee observed the response of oats to copper treatment; they saw the effect of zinc treatment as to white bud of corn; they viewed the response of both pasture grasses and cattle to the proper use of minor elements. Cattle, it was observed, tripled their gain of weight when grazing on a fertilized legume-grass pasture rather than on an unfertilized pasture. Legume stands have been increased by nitrogen applications and effective inoculation. New strains of white Dutch clover that withstand hot dry weather were growing on sandy land. Frozen citrus juice concentrates, mixed with water, tasted like fresh juice.

At the Citrus Experiment Station at Lake Alfred, the results of research work are correlated into a unified program of recommendations for citrus growers. Soil technologists, agronomists, horticulturists, pathologists, entomologists and other workers all integrate their findings into one program for action. A tour through the station's citrus grove provides convincing evidence that the recommendations are producing quality fruit. The fine working relationship between station workers, growers and supply industry representatives in the area is particularly noteworthy, resulting in strides toward standardization of cultural practices such as fertilization and spraying. An example of a grade of fertilizer recommended for citrus fruit is four per cent nitrogen, six per cent phosphoric acid, eight per cent potash, three per cent magnesium oxide, one per cent manganese oxide, and one-half per cent copper oxide.

From Winter Haven a side trip was made to visit the phosphate deposits near Mulberry. Manager R. B. Fuller of the International Minerals and Chemical Corporation's Florida Phosphate Division and his associates showed a dragline with a 215-foot boom moving overburden and phosphate matrix in a bucket that took 21 cubic feet (30 tons) at a bite.

The matrix is mixed with water and carried through pipes to the washer, where it is washed, screened and graded. The larger sizes of phosphate rock are then sent to the loading bins. The smaller particles are further processed; the sand is separated from the phosphate rock by a special process and the rock is dried in a rotary kiln and conveyed to the loading bins. After viewing the whole operation, one wonders how the end-product, phosphate rock, can be sold for a few dollars per ton.

Fig. 2. This caterpillar tractor with scraper attached is used to level the field after the scarifier shown at the side of the tractor has broken the soft calcareous rock

Fig. 3. N.E.A.'s Plant Food Research Committee inspecting oats plots which have received treatments of minor elements

Proceeding down the Florida peninsula to Brighton, the committee and their guests called on Jesse Durrance who has converted "salt sick" land into excellent grazing land by applying fertilizer and copper to the soil and who gives the cattle other needed minerals in their drinking water.

Muck land at the Everglades Experiment Station that quivers under your feet produces outstanding crops of celery and other vegetable crops. As much as three to four tons of fertilizer per acre is applied to celery. Pastures also grow luxuriantly when mineral fertilizers including copper are used. One of the pasture plots included in an experiment at

(Continued on page 19)

McCarty Elected Director of Seaboard Airline Railroad

At a meeting of stockholders of the Seaboard Airline Railroad Co., held in Norfolk on May 26th, George W. McCarty, president of Ashcraft-Wilkinson Co., of Atlanta, was elected a member of the board of directors.

Mr. McCarty has been identified with the fertilizer industry for more than thirty years, having been connected with Ashcraft-Wilkinson Co. as officer and director since 1916. He is also a director of A. D. Adair & McCarty Brothers and of the Interstate Mills, Inc., Cairo, Ill.

During the war, he was assistant chief of the Nitrogen Unit, Chemical Branch, War Production Board.

His many friends in the industry are congratulating him on this new honor, and the Seaboard Airline on their securing the services of one of the outstanding business leaders of the South.

New Alabama Fertilizer Plant

The new plant of the Sand Mountain Fertilizer Company, Attalla, Ala., was recently inspected by a representative group of local business men. The plant, which comprises a new A-frame building measuring 140 by 130 feet, a nitrate warehouse and an office, was begun in 1946 and operation started last January. Annual capacity is 15,000 tons.

The company is operated by T. W. Allen and G. P. Phillips who have had 20 years' and 13 years' experience, respectively, in the production and sale of fertilizers.

Spencer Chemical Company Announces 1947 Prices

Spencer Chemical Company, Kansas City, Mo., has announced prices for Spensol nitrogen solutions effective July 1, 1947, as follow:

Spensol A (40.6% nitrogen; composition, 21.7% anhydrous NH_3, 65% ammonium nitrate, 13.3% water) $45.50 per ton.

Spensol B (40.8% nitrogen; composition, 26% anhydrous NH_3, 55.5% ammonium nitrate, 18.5% water) $43.25 per ton.

Spensol C (37% nitrogen; composition, 16.6% anhydrous NH_3, 66.8% ammonium nitrate, 16.6% water) $42.50 per ton.

The prices are f.o.b. Military, Kan., but freight equalization allowance will be made as may be necessary to equalize freight charges on a per-ton-of-solution basis with Hopewell, Va.; Belle, W. Va.; South Point, Ohio; or El Dorado, Ark.

V-C Promotes Dickinson and Heinrichs

The Virginia-Carolina Chemical Corporation announced on June 2nd the appointment of Alfred J. Dickinson as Acting Manager of the Purchasing Department, and of Charles E. Heinrichs as Manager of the Phosphate Mining Department.

Mr. Dickinson has been connected with the V-C Company since 1938 and with the Purchasing Department since early in 1946.

Mr. Heinrichs was formerly vice-president of the Phosphate Mining Company prior to its acquisition by V-C. He has had a wide experience as a practical mining operator as well as in the field of research. His new duties will include both the Florida and Tennessee Divisions.

FERTILIZER MATERIALS MARKET

NEW YORK

Principal Interest in Supplies for Next Season. New Prices Awaited on Sulphate of Ammonia and Superphosphate Fertilizer Organic Prices Increase. Potash Contracts Rapidly Taking Next Years' Production. French Potash Imports Completed

Exclusive Correspondence to "The American Fertilizer"

With the wind-up of the fertilizer mixing season, which this year has extended some weeks beyond the usual period, manufacturers are looking forward to supplies of materials for next year's production. Potash producers have written up a considerable amount of business for the coming season and are faced with the problem of taking care of customers' demands for quantities in excess of last year's purchases. Many contracts for sulphate of ammonia and superphosphate expire on June 30th but to date no future prices have been announced.

There are no appreciable stocks of any basic fertilizer material to be carried over into the new season, and in some cases current contracts will not be completed until well into the new season. It is understood that the International Emergency Food Council has definitely decided against world-wide allocation of potash and soluble phosphate supplies for 1947–48, but controls will be maintained on nitrogen. Announcement of nitrogen allocations is expected momentarily. It is generally anticipated that world production of basic fertilizer materials will continue to improve, but scarcities will exist in some areas for another year at least.

Sulphate of Ammonia

There is practically no spot material on the market. Shipments from producing plants are on previous contracts which take all the current production. Future contract prices are uncertain with the trade expecting an increase. Some producers are planning to sell direct and prices will probably be announced shortly.

Nitrate of Soda

The domestic and foreign supply available is insufficient to meet the demands. Buying conditions are above normal as the farmers are asking for more n trogen than usual, for top-dressing purposes.

Organic Materials

Very little fertilizer organic material is in the market. Prices for nitrogenous tankage have ranged from $4.50 to $5.50 per unit of ammonia ($5.47 to $6.68 per unit N), f.o.b. producing plants. Dried blood, tankage and bone meal are well beyond the fertilizer price level but feeders are not showing any great interest except at the lower prices which have prevailed the past few weeks.

Phosphate Rock

The situation is still tight, in spite of expanding production facilities. Acidulators are still taking entire current production and the railroads have shown improvement in deliveries. Allocations will be discontinued on June 30th.

Superphosphate

Shipments are still on contract only. Inquiry is still strong, particularly from the Middle West. With many contracts expiring at the end of this month, interest is centered on the prices for next year's schedules. It is expected that the current spot prices will be maintained for future contracts, in view of the increased cost of phosphate rock.

Potash

Producers have made a considerable number of contracts fo 1947–1948 shipment. In most cases, buyers want increased quantities and the potash companies have a problem to take care of all customers with their expected level of production. The allotment of French potash, totaling 16,500 tons, has now been received and it is not known if additional quantities of this material will be available during the coming fall and winter. If all U. S. demands are to be met, additional imports will be necessary.

PHILADELPHIA

Manufacturers Report Continued Demand for Mixed Goods. No Improvement in Natural Supply. Organics Prices Higher

Exclusive Correspondence to "The American Fertilizer"

PHILADELPHIA, June 9, 1947.

Lateness of the season seems to be reflected in the continued demand for agricultural chemicals. Mixers in this section are still quite busy winding up the season, and there is considerable interest being shown in supplies for the future. It is reported from the West Coast that considerable tonnage of ammonium nitrate for export is being held up by refusal of longshoremen to load steamers.

Sulphate of Ammonia.—Although production is up and shipments are moving with fair regularity, the general demand is still ahead of supply. The buying position continues tight, with additional interest in the prospects for the coming season.

Nitrate of Soda.—Strong demand continues and buying conditions remain very tight. Al arrivals have been immediately absorbed.

Castor Pomace.—Activity is restricted to deliveries on existing contracts, with no additional offerings in prospect. Several of the producing plants are scheduled to shut down during part, if not all, of July. The pomace situation is governed entirely by the production of, and market conditions surrounding, castor oil. Pomace is quoted nominally at $37.50 per ton at the producing factory.

Blood, Tankage, Bone.—The market for organics has had the appearance of renewed strength, due apparently to lack of offerings of cake meals by the oil mills, and some little buying interest shown by the feeding trade. While blood sales had been reported as low as $6.50 per unit of ammonia ($7.90 per unit N), asking prices are now $7.50 to $8.00 ($9.12 to $9.72 per unit N) for blood, with tankage at $7.00 to $7.50 ($8.51 to $9.12 per unit N). These prices are too high for the fertilizer man and he shows practically no interest. There is some demand for bone by the feeders, which keeps the market fairly firm.

Fish Scrap.—A few offerings appeared at prices too high for consideration by the fertilizer mixer.

Phosphate Rock.—Demand continues ahead of production, and buying conditions remain exceedingly tight.

Superphosphate.—This material continues in short supply against present demand, and considerable interest is being shown in the probable supply for the coming fiscal year.

Potash.—Inquiries are numerous for prompt and future, and the demand is for more than the domestic production can supply. Deliveries of the recent French allotment have been completed, and it is not known whether further shipments are contemplated.

CHICAGO

Sales of Nitrogenous Reported but No General Offerings. Feed Market Spotty

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, June 7, 1947.

Rumors, presumably confidential, have reached this market of a few transactions in nitrogenous organics, and reports indicate they were at sellers' asking prices. Free offerings are not as yet being made by the producers.

In the feed market, demand appears inclined to be spotty, prices for wet rendered tankage ranging in the neighborhood of $7.00 per unit ammonia ($8.51 per unit N), depending on quality and shipping point. Unground dried blood demand is light, prices at about $6.75 per unit ammonia ($8.20 per unit N), delivered buyers' plants where freight si not excessive.

CHARLESTON

Spring Shipping Season Continues Later than Usual. All Materials Still in Heavy Demand with Short Supplies

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, June 6, 1947.

Shipping orders for mixed fertilizer have continued long beyond the usual period and the fertilizer manufacturers will carry over practically no stocks.

Organics.—Not many offerings of organics for the new season have come out yet and the South American market continues to quote above the prices that can be obtained on domestic material. It is plainly evident now that very little, if any, European organics will be obtainable. Domestic nitrogenous is quoted at $4.75 per unit of ammonia ($5.77 per unit N), f.o.b. Midwestern production point for May/June shipment in a very limited quantity.

Castor Pomace.—Though importations of castor beans have increased, the producers of castor pomace are still not prepared to take on additional business.

Blood.—Price is around $6.75 to $7.00 per unit of ammonia ($8.20 to $8.51 per unit N), bulk, f.o.b. Chicago, with little interest from buyers.

Tankage.—Fertilizer grade around $7.00 per unit of ammonia ($8.51 per unit N), f.o.b. Chicago.

Nitrate of Soda.—Demand continues to exceed the available supply on Chilean material and the domestic production continues short.

Sulphate of Ammonia.—There is an insistent demand for nearby material which cannot be filled.

Superphosphate.—Though there has been a record production, calls for this material continue beyond the supply and indications are that the shortage will continue for many months to come.

Phosphate Rock.—This market continues extremely tight, due largely to the car shortage.

Brand Establishes Research Fellowship

A fund of $15,000 has been given by Charles J. Brand, former Executive Secretary and Treasurer of The National Fertilizer Association, to create a graduate fellowship in botany at his alma mater, the University of Minnesota, in honor of the late Professor Conway MacMillan, former head of the Department of Botany in that university. Mr. Brand plans to add to this fund and hopes to interest former students of Professor MacMillan in making the fellowship permanent.

The Fellowship with a stipend of $1,200 a year will be awarded each year to a research student holding a master's degree from the University of Minnesota or an institution of similar standing. Mr. Brand particularly specified that candidates holding master's degrees from the University of Chile or the Catholic University of Chile are to be accepted as applicants on an equality with those from institutions of this country. This provision is included because of the honor bestowed on Mr. Brand by the Republic of Chile in giving him the Order Al Merito with the rank of commander, the highest honor bestowed on civilians who are not citizens of Chile.

The selection committee consists of the following University of Minnesota officials: the head of the Department of Botany, the dean of the Graduate School, and the dean and director of the Department of Agriculture. The Fellowship for 1946 was awarded to A. Stanley Holt, Rhode Island State College, whose field of research is the evolution of oxygen by chloroplastics in the presence of oxidizing agents.

Cattle Climb Hill for Fertilized Pasture

How phosphate fertilizer made "hill climbers" out of a herd of cattle is a story that might help convince East Texas farmers that fertilization is here to stay.

It has convinced one East Texas farmer, at least. He is Thomas Champion, Wood County farm unit demonstrator and owner of the hill-climbing cattle.

County Agricultural Agent E. A. Spacek explains that Champion had heard a lot about what phosphate would do for clovers and grasses when applied to pasture land. Half joking, he spread the fertilizer on top of a knoll in one of his pastures last fall.

"It didn't fool anybody. Not even the cows," Champion told the county agent. Every morning the cattle all make the climb up the knoll to graze the phosphated land, where the grass and clover is shades greener and inches taller.

"Sure looks funny to see those cows trudging up the hill every morning when there is plenty of clover and grass down at the bottom," Champion said.

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Bemis to Distribute Fischbein Bag Coser

The Dave Fischbein Co. of Minneapolis' manufacturers of industrial sewing machinery' has appointed Bemis Bros. Bag Co., with its many strategically located sales divisions and offices, exclusive distributor of their new hand electric filled bag closer.

The machine weighs less than eleven pounds, including full cone of thread, and is the only bag closer of its kind on the market. Designed and constructed exclusively for bag closing, it operates from any AC or DC 110-volt line, and is ideally suited for closing cotton and burlap, as well as most kinds of paper bags. It will close about one hundred bags an hour, with tight and uniform stitches, four to the inch.

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Requiring no skill, operators have only to guide the machine, holding bag in one hand and the closer in the other. A conveniently located switch on the handle makes starting and stopping possible with a flick of the thumb.

Currently priced at $225.00, net Minneapolis, the new machine fulfills a variety of bag closing needs, and according to the Bemis Company is meeting with much success. Production of the units is being increased by the Fischbein Company, and they report ability to make prompt shipment.

April Sulphate of Ammonia

There was little change in the production levels of by-product sulphate of ammonia during April, according to the U. S. Bureau of Mines. The output amounted to an even 65,000 tons, compared with 67,674 tons in March. Shipments exceeded production by over 12,000 tons and, as a result, stocks on hand at the end of April had declined to 19,541 tons. During the first four months of the year, the output totaled 262,021 tons, an increase of 45 per cent over the same period of 1946.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
Production		
April, 1947	65,000	2,375
March, 1947	67,674	2,471
April, 1946	47,222	2,051
Jan.-April, 1947	262,021	9,293
Jan.-April, 1946	180,508	8,057
Shipments		
April, 1947	77,684	2,276
March, 1947	74,577	2,279
April, 1946	52,598	2,011
Stocks on Hand		
April 30, 1947	19,541	787
March 31, 1947	32,719	835
April 30, 1946	15,176	541

N. F. A. FLORIDA INSPECTION TRIP

(Continued from page 13)

this station produced beef at the rate of a ton per acre annually, "believe it or not."

At the Subtropical Experiment Station near Homestead the visiting group saw groves of avocados, as well as tomatoes and other crops growing luxuriantly on soil prepared by scarifying soft rock. The prepared seed bed appears to be made up principally of stones but under the guidance of soil scientists, resourceful engineers and plant breeders, it is supporting a thriving agriculture.

Near Florida City, the last town on the southern tip of the Florida mainland, potatoes are grown on a marl soil. Here, the water table is usually so near the surface that a system of canals has been devised in order that the water table can be lowered during wet seasons or raised if occasion demands.

After seeing the many obstacles overcome by the agricultural scientists in Florida, the group came away feeling that almost any agricultural problem can be solved through persistent and intelligent application.

SENATE HEARINGS ON FERTILIZER BILL

(Continued from page 8)

western states already have a capital investment of well over $10,000,000."

In answer to the "phenomenal increase in demand" for fertilizers in the Midwest, Metzger said a plant at Waterloo, Iowa, has doubled its capacity; a new plant at Mason City, Iowa, is doubling its capacity; two new plants are being built at Omaha; a dry-mix plant has been completed at Des Moines and another large plant is being built at Dubuque, Iowa; a new plant has been built at Minneapolis and two more are under construction in Minnesota; five plants have been added in Wisconsin and "numerous plants constructed" east of the Mississippi, in Illinois, Indiana and neighboring States. He said that "any one of these new plants, 10 years ago, could have taken care of all the demand in Iowa and the adjoining States."

Maurice H. Lockwood, President of the National Fertilizer Association, included with his testimony many exhibits showing (1) the increase in average plant nutrient content in fertilizers by a typical cooperative since 1923, (2) the doubling of fertilizer output in the last decade, (3) N.F.A.'s annual consumption report for 1946, (4) maps of consumption in the U. S. in 1946 and of the location of the industry today, (5) the increase in U. S. superphosphate production through 1946, and (6) the names and locations of some 70 fertilizer plants built since 1940, now under construction or projected, including established plants that have increased their capacity 50 per cent or more since 1940. Written statements, provided by many members, were filed with the committee.

J. R. Simplot, Simplot Fertilizer Sales Co., Pocatello, Idaho, spoke extemporaneously about new plant expansions for normal and concentrated superphosphate production in the West.

Dr. G. F. MacLeod, technical vice-president of Sunland Industries, Fresno, Calif., presented a laboratory demonstration, using pure plant food elements, and showing the folly of believing that a 100 per cent pure fertilizer can be produced. He accompanied his testimony with a paper entitled "What's in a Bag of Fertilizer?"

Howard A. Parker, president, Sylacauga Fertilizer Co., Sylacauga, Ala., directed his

(Continued on page 22)

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✓ **Extra Quality** for your fertilizer because Lion Nitrogen Solutions give you the means to use maximum amounts of both ammonia nitrogen and nitrate nitrogen.

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Water	13.3%
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Ammonia Nitrogen—29.22%	

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attention to the opposition to S. 1251 in his State and also presented an N.F.A. chart showing that TVA's latest published costs of producing concentrated superphosphate, without overhead, are substantially higher than the industry's selling price.

Louis Ware, president, International Minerals and Chemical Corp., Chicago, Ill., stressed the fact that the U. S. phosphate and potash industries have given a most creditable performance during these recent years of unusually high demands.

C. T. Prindeville, vice-president, Swift & Co., Chicago, Ill., told the Senators, among other things, that the cost of delivering one unit of phosphoric acid to a Southern farmer is less if delivered as normal superphosphate manufactured at existing Southern plants than it would be as triple superphosphate made at Mobile.

R. P. Roos, secretary-treasurer, N. S. Koos & Son Co., Kenosha, Wis., provided conclusive evidence that the industry—particularly in the Middle West—is a capable one and can progress without Government expenditure in fertilizer plants, test demonstration programs and elaborate, expensive personnel such as is detailed for the program.

Lester E. Britton, manager, Fertilizer Department, Consolidated Rendering Co., Boston, Mass., brought out that no farmer in New England has suffered for fertilizer during the entire war period.

B. W. Bellinger, general manager, U. S. Phosphoric Products Division, Tennessee Corp., New York, emphasized advances in triple superphosphate production and expressed the firm opinion that U. S. D. A. assisted by other agencies, including the industry, can attain the objectives of the bill efficiently and effectively.

TVA Witnesses

On the last day of the hearings, four representatives of TVA and one from the North Carolina Extension Service spoke in favor of the bill. Gordon R. Clapp, newly appointed TVA chairman, explained the selection of Mobile as the site for the proposed plant. He emphasized the need for large quantities of low cost electric power as the plant was intended for the production of elemental phosphorus for war purposes as well as for the production of fertilizer material. The Mobile plant, would use the blast furnace process.

Charles H. Young, Director of the TVA Chemical Engineering Department, in an-

KS

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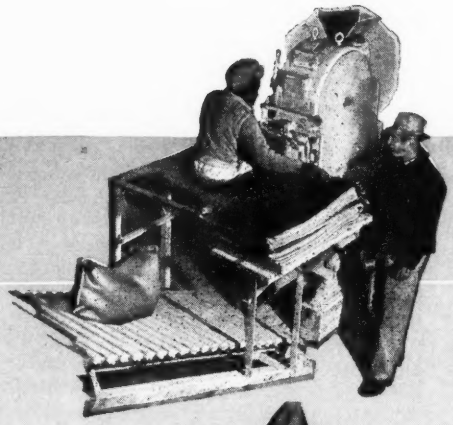

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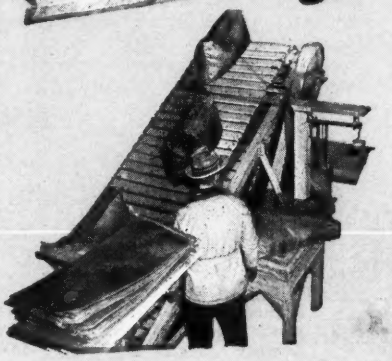

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swer to a committee member's question concerning the process to be used at the proposed Mobile plant, stated that the Victor Chemical Company had at one time operated in Tennessee a blast furnace unit for elemental phosphorus production but had abandoned it later for a different process. Questioned as to the reason for TVA wishing now to develop the blast furnace process on a commercial scale at Mobile, Mr. Young stated that new developments in that process in recent years warant its further exploitation on a commercial scale, but expressed doubt as to the industry's willingness to use the method until Government has demonstrated its practicability on a commercial scale.

Several references were made by the TVA witnesses to the desirability of furnishing minerals to fertilizer users in the unmixed forms rather than as mixed fertilizers, inferring that the fertilizer industry did not offer materials freely and stating that most of the demonstrations sponsored by industry were with mixed fertilizers containing nitrogen, phosphoric acid and potash.

The hearings were adjourned until June 24th when it is understood that representatives of other farm organizations will be heard in opposition to the bill.

PLANT FOOD LEVELS IN FERTILIZERS

(Continued from page 00)

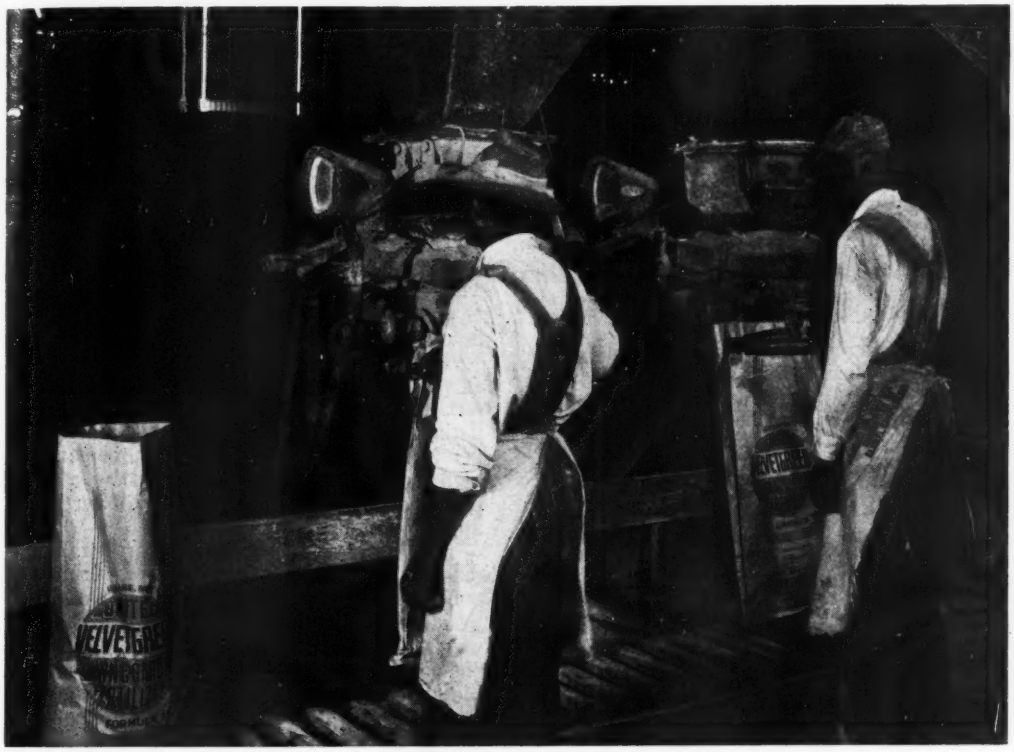
supply any sulphur to the mixed fertilizer. More research is necessary on amount of sulphur needed, and the soils and crops to which it should be applied. It should be noted (Table 3) that ordinarily there is enough sulphur supplied in the average fertilizer to take care of plant removal. The exceptions to this are the minimum amounts supplied by certain fertilizers formulated without sulphur-containing compounds.

Although the addition of both calcium and magnesium through lime has been mentioned, particular consideration might be accorded to magnesium in the South because of the low content of magnesium in many soils and the prevalence of magnesium deficiency in many sections of the Southeast. That this need is recognized is evidenced by the fact that in 1944 and 1945 the average mixed fertilizer contained 2.07 per cent MgO and over half of this was deliberately added in the form of magnesic materials (Unpublished data supplied by A. L. Mehring). It is certain that we should not recommend a change from a lower analysis fertilizer to a higher one unless it carries adequate quantities of the secondary elements needed for the farming system being followed.

TABLE 3[1]

Commercial Mix:	CaO %	MgO %	SO_3 %
Complete (12–20% total plant food)			
Minium	5.74	0.10	11.97
Maximum	23.52	7.67	27.65
Average	14.76	1.21	20.23
Complete (21–40% total plant food)			
Minium	5.20	0.15	8.38
Maximum	19.88	3.79	23.96
Average	11.71	1.08	17.26
Complete (over 40% total plant food)			
Minimum	0.30	0.11	.00
Maximum	14.58	0.64	22.06
Average	4.63	0.26	3.49

[1] Taken from Mehring and Lundstrom, THE AMERICAN FERTILIZER, January 22, 1938.



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Trace Elements in Mixed Fertilizers

The trace elements present a more specific situation. While there is no doubt that these elements have a place in the fertilizer program, it would seem that they should be included in mixtures only for specific purposes and not as a general prescription. The necessity for their inclusion cannot be overlooked, however, and where used, they would certainly affect the limits to which we could go in high analysis mixtures.

Application of Concentrated Fertilizers

With increasing concentration of plant food in fertilizers, there comes the question of its effect on injury to crops and reduction in stand. In the South this has caused particular apprehension because of the usual methods of applying fertilizers. The common methods often result in placement of fertilizer directly under and too close to the seed.

A factor often overlooked in this connection is that high analysis fertilizers, per unit of plant food, will frequently have less injurious effect on stand and growth than low analysis fertilizers. This is because of the necessity of using high analysis materials, which generally have less salt effect per unit of N, P, or K, than low analysis materials. This is illustrated by the theoretical examples listed in Table 4. This shows that two different 4–10–4 fertilizers can be prepared with one having a relative salt injury effect on seeds of 2.5 times the other. In fact, if we used the high analysis materials given in the second example, it would be possible to make an 8–20–8 fertilizer with a salt index of 43.6, or less than the 4–10–4 made up with lower analysis materials. Thus high analysis fertilizers are not as likely to create a problem in stand injury as might be imagined.

TABLE 4
SALT INDEXES OF TWO 4–10–4 FERTILIZERS FORMULATED FROM DIFFERENT MATERIALS

Per cent Plant Food Supplied	Material	Salt Index
4% N	16% Nitrate of Soda	24.2
10% P_2O_5	18% Superphosphate	4.3
4% K_2O	17.5% Kainit	25.0
	Total Salt Index	53.5
	Index per unit Plant Food	2.97
4% N	32% Ammonium Nitrate	12.0
10% P_2O_5	48% Superphosphate	2.1
4% K_2O	60% Muriate of Potash	7.7
	Total Salt Index	21.8
	Index per unit Plant Food	1.21

At the same time it should be realized that, as we go to high grades using the same materials, we are more likely to produce injury if the fertilizers are applied at the same rate per acre. And undoubtedly a movement to high grades will not be followed by a proportionate reduction in amount of fertilizer applied per acre.

This brings up the question of proper placement of fertilizer. Cooperative experiments conducted by the U. S. D. A. and several experiment stations have shown that placement was the most important factor influencing the soluble salt content of the root-zone soil. Side-band placement of high analysis fertilizers resulted in less soluble salts in the root zone than under-seed placement of fertilizers with a lower salt index. Tractor equipment that permits satisfactory placement is available and is very general in most parts of the country, but is only in limited use in the South. Horse-drawn equipment that provides for band placement is available but is actually used by a relatively small percentage of the southern farmers. We have to face the very real fact, then, that higher analysis fertilizers, if distributed in the South today, would be largely placed under the seed. Again we are faced with an educational problem that has several aspects. The farmer will have to learn to apply less of the high analysis

materials to furnish the same plant food elements, and he will have to look toward the use of efficient placement machinery. This is complicated by a system of farm tenancy that makes both of these problems even more difficult to put across.

It should be recognized that in some sections of the country, it should be possible to go to higher concentrations of fertilizers than in others. The soils of the central and western parts of the U. S. are generally much better supplied with calcium and magnesium than those in the South. The farmers of the former areas use machinery largely for fertilizer distribution. Mixed fertilizers containing 30 to 40 per cent of N, P_2O_5 and K_2O often may be used profitably under such conditions. On the other hand, in the South, particularly the Southeast, 30 to 40 units would usually not permit provisions for neutralization and the furnishing of desirable secondary plant foods. If these factors are taken into account, a total of from 20 to 30 units of plant food are about as high as we can expect to go in the case of fertilizer carrying nitrogen, phosphorus and potash. Higher analyses could, of course, be expected when formulating two-constituent types such as 0–9–27 or 10–0–30, which are usually designed for top-dressing.

Summary

In summary, it is evident that the use of higher analysis fertilizers offers promise from the standpoint of economy as far as nitrogen, phosphoric acid and potash are concerned. The secondary elements must be considered, however, as well as the acid-forming properties of the fertilizer. Placement equipment is available, but in the South, with tenant labor, its general use is not without difficulties. A thorough program of education would have to accompany and possibly precede any drastic change in plant food concentration in fertilizers.

FERTILIZER STATISTICS

(Continued from page 11)

constantly up to date with statistics, while periodic reports do not accomplish this nearly so well. Unless a control official has tried this method, he has no conception of the great value of these current reports in control work.

Another way to collect these statistics would be to require the manufacturers to make semi-annual reports of sales of the different grades in each county. This would be requiring the manufacturer to do a great deal of additional work which should properly be done by the control official. The additional work would not be great where the number of counties in the State is small, but would be considerable in the larger States.

Publication of Analyses

Until the statistics and analyses are published, this work is without value to anyone except the control official. A letter giving this information to fertilizer manufacturers is undoubtedly of value to that particular group, but such information is of value and should be distributed or made available to many other groups. The distribution of the publication should be as wide as necessary to get the information to all interested parties. Provision for the regular periodic publication of this type of information should be included in the fertilizer law of each State.

Conclusion

In conclusion, I believe that it is the function of the State control official to collect all pertinent statistics, analyze them in sufficient detail that the analyses may be of maximum value to all interested parties, and to publish and distribute these analyses as soon as possible after the termination of the time period covered. These analyses should be so

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made that all information of national interest is given on a uniform basis among the States so that the individual State reports may be compared or combined directly and easily in working out national analyses.

Discussion by A. L. Mehring

County data on fertilizer consumption are of national, as well as local interest because they can be used to gain a better understanding of the relationship between soils, crops, farming systems, climate, etc., than can data collected on a State basis. The reason for this is that many counties are relatively much more homogeneous with respect to the factors just mentioned than are States. A county is a better unit for statistical studies of relationships than is a State.

The Federal Government is not, however, in position to collect details on fertilizer usage

TABLE 3.
CONSUMPTION OF FERTILIZERS BY CLASSES IN MISSISSIPPI AND IN THREE OF ITS COUNTIES, 1933 TO 1945
(Short tons)

Fiscal Year[1]	Ammonium sulphate	Cyanamid	Nitrate of soda	Other nitrogenous	Superphosphate	Mixed	All other[2]	Total
				Copiah County				
1933	34	0	564	50	1,301	10,797	121	12,867
1937	11	5	1,329	145	272	11,536	56	13,354
1941	53	5	1,774	0	60	4,890	14	6,796
1945	1	0	2,733	35	165	8,759	13	11,706
				Madison County				
1933	12	0	26	0	124	187	13	362
1937	57	0	661	0	500	1,871	130	3,219
1941	7	0	1,059	17	513	2,102	222	3,920
1945	0	60	1,718	402	2,135	5,031	41	9,387
				Sunflower County				
1933	30	0	20	30	0	0	0	80
1937	2,611	2,010	1,610	594	0	0	25	6,850
1941	7,534	2,910	7,964	0	24	28	54	18,514
1945	0	1,508	8,370	5,014	0	58	0	14,950

[1] Fiscal years ended June 30th.
[2] Bone meal, ground phosphate rock, ammonium phosphates, and potash salts. Tabulated from annual fertilizer tonnage reports of the Mississippi Department of Agriculture.

TABLE 4.
PLANT-FOOD RATIOS AND RATES OF APPLICATION OF FERTILIZERS USED ON THE PRINCIPAL SOIL AND CROP AREAS OF LOUISIANA, YEARS ENDED JUNE 30, 1939 AND 1945

Area[1]	Major soil series[2]	Principal fertilized crops[3]	Harvested crop acreage 1939[4]	Weighted average rate of fertilizer application[5]		Plant-food ratios[5]		
				1939	1945	N	P_2O_5	K_2O
			Acres	Pounds per acre	Pounds per acre			
I	Alluvial	Truck	25,300	376.5	382.6	1	1.10	0.38
II	Alluvial	Sugar cane	504,160	86.6	115.6	1	.11	.05
III	Alluvial	Cotton	1,050,450	33.0	59.0	1	.30	.16
IV	Caddo-Beauregard	Fruits and nuts	78,951	344.0	463.6	1	2.27	.72
V	Lake Charles-Crowley	Rice	536,330	72.8	87.4	1	3.14	1.39
VI	Memphis-Grenada	Cotton	472,053	26.4	64.7	1	.76	.38
VII	Norfolk-Ruston	Cotton	1,155,981	105.3	103.2	1	.68	.33
	Miscellaneous	Diverse	228,445	71.0	97.4	1	1.69	.66
State	Diverse	Cotton[6]	4,051,670	69.3	94.9	1	.67	.32

[1] All parishes, wholly or largely within the soil series indicated and having 20 per cent or more of the total crop acreage in 1939 in the specified crop, are included.
[2] Soils and Men (folded soil map) Yearbook of Agr. 1938.
[3] Census of Agriculture 1940 Vol. 1 Pt. 5 Statistics for Counties, Dept. of Commerce. (See also footnote 6.)
[4] Total harvested crop acreage of the parishes included in the respective areas as shown.
[5] Calculated from fertilizer grade tonnage reports of the Louisiana State Department of Agriculture and Immigration and the acreage in the preceding column for the corresponding parishes.
[6] The percentages of the total tonnage of fertilizer used in 1939 on the principal crops are estimated as follows: Cotton 52, Sugar cane 12, Fruits and nuts 12, Rice 7, Corn 6, Vegetables 6, Oats 4, and all other 1 per cent. In a number of parishes the largest crop acreage was in corn or legumes, but in no case was either of them the principal fertilized crop.

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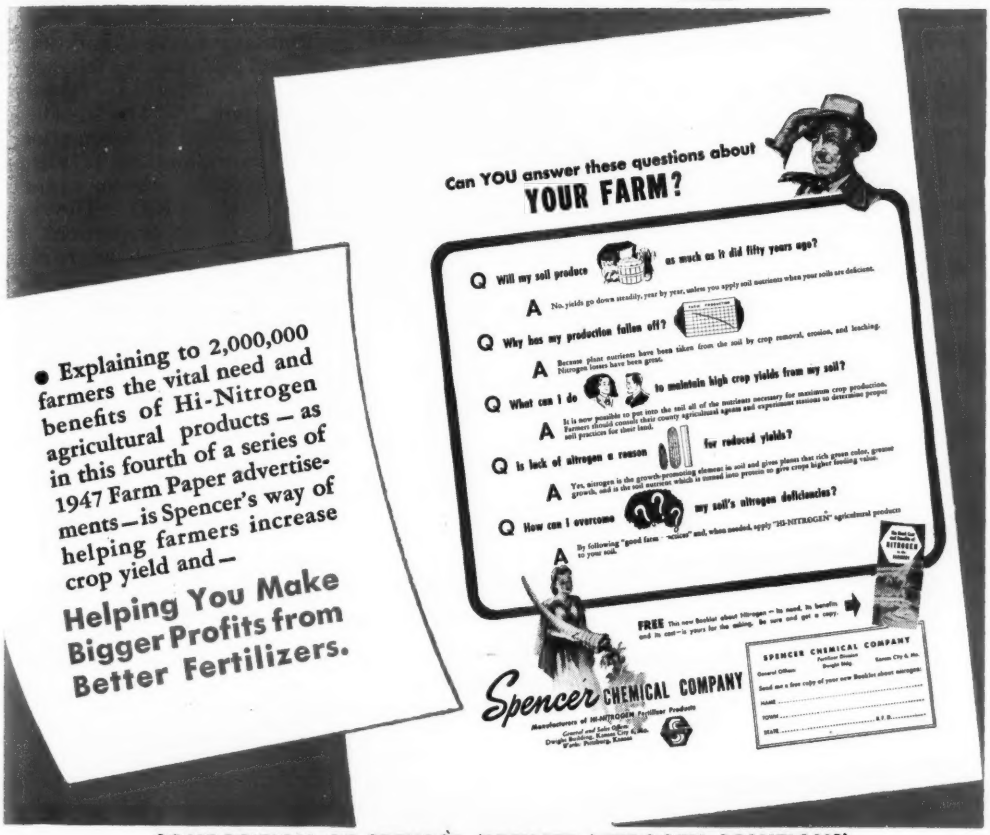

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at the county level, and for that reason we would like to see more States publish their tonnage consumption by counties. In order to emphasize the importance of this we have prepared some tables which will illustrate the valuable information that may be obtained from county data.

In no case is the use of fertilizer uniform throughout a State. On the contrary, in most cases its use is localized. For example, the 1939 census of agriculture shows that Aroostook County, Maine, used over three-fourths of all fertilizer sold in the State, although 15 other Maine counties also used fertilizers.

Mississippi Statistics

Although Mississippi as a whole used four times as much fertilizer in 1945 as in 1933, Copiah County, a truck crop area, actually used less in the more recent year, as may be seen in Table 3. In fact in 1941 this county consumed less than half as much as the average in the years from 1933 to 1939. A large part of the total consisted of mixed goods. On the other hand, consumption in the other two counties, picked at random to represent the delta and upland sections of the State, was very low in 1933 but increased very rapidly since then. This growth in Sunflower County (delta) consisted almost entirely of chemical nitrogen. In Madison County the balance between the various materials and mixed goods seems about normal for the corn and cotton areas of the Southeastern States.

Louisiana Statistics

Not only is the quantity of fertilizer used different in different counties, but in the few States where the evidence is available the kinds and proportions of plant nutrients are different also. For instance, Table 4 shows how this is true in Louisiana. Although ten or more different kinds of fertilizers are used in most of the parishes, one grade of mixed fertilizer or one kind of simple material supplied more than half the tonnage in nearly half the parishes. The point I wish to stress is that the most popular kind varies greatly from one part of the State to another, even in States much smaller and less diverse in soils and climate than Texas. Area 1 in the table is composed of those parishes located on the alluvial soils of the State and devoted largely to growing truck crops, such as Orleans Parish. The rate of fertilization per acre of harvested cropland is very high and has not changed materially between 1933 and 1945. Slightly more P_2O_5 was used than N. The so-called sugar bowl parishes, Ascension, Assumption, Iberville, etc., use large quantities of nitrogenous materials, especially calcium cyanamide, but very little P_2O_5 or K_2O. The rice area (V) uses relatively high proportions of P_2O_5 and K_2O. In Calcasieu Parish, where rice is the most important crop, 0–14–7 is the principal fertilizer. Cotton grown on the Norfolk-Ruston Soils receives much more fertilizer per acre than that grown on the alluvial soils. The proportions of P_2O_5 and K_2O are also higher on the Norfolk-Ruston Series.

Louisiana consumed 14,230 tons of basic slag in the year ended June 30, 1945. Most of this was used on soils of the Memphis-Grenada Series. There are two areas of such soils in Louisiana, one centering in Lafayette Parish, west of the Mississippi River, and the other north and east of Baton Rouge. The use of basic slag is widespread in both of these areas. Thirty-eight parishes that contain little or no soils of the Memphis-Grenada type also use no basic slag.

Much more information could be obtained if similar data were available for counties in more States.

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